

REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-5 are presently active in this case. No claims are amended, canceled, or added way of the present amendment.

In the outstanding Office Action, Claim 1 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sato, et al. (U.S. Patent No. 4,626,174, herein "Sato") in view of the background discussion at page 2, lines 23-24 of Applicants' specification (herein "BD"). Claim 2 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sato as modified by BD, and in further view of obvious design choice. Claim 3 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sato, as modified by BD, in view of Shizuya, et al. (U.S. Patent No. 4,786,233, herein "Shizuya"), and further in view of obvious design choice. Claim 4 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sato, as modified by BD, in view of Shizuya, and further in view of obvious design choice. Claim 5 was rejected under 35 U.S.C. § 103(a) as unpatentable over Sato, in view of obvious design choice. For the reasons discussed below, Applicants respectfully submit withdrawal of the obviousness rejections.

In rejecting Claim 1 under 35 U.S.C. § 103(a) over Sato in view of BD, the Office Action notes that the Applicants' specification teaches increasing the turning angle of a blade for the purpose of increasing work  $\Delta H$  (at page 2, lines 23-24, of Applicants' specification), thus constituting Applicants' admission that the technique of increasing the turning angle is known in the art (Office Action at page 2).

In response, Applicants respectfully note that the specification also describes that when only the influent angles  $\alpha_3$  and  $\alpha_4$  are set larger, thus increasing the turning angle, a deceleration passage forms from the front edge to the rear edge of the blade (see the single-

dot-chain curve in FIG. 8). As a result, the flow of the combustion gases is decelerated, and turbine efficiency loss increases (see specification at page 4, line 11 - page 5, line 3, the solid line curve in FIG. 5). Therefore, increasing turning angle *ceteris paribus* results in a rapid decrease in turbine efficiency due to the formation of deceleration passage. Thus, merely increasing the turning angle of Sato above 120 degrees, as suggested in the Office Action, would likely result in a deceleration passage being formed and increased turbine efficiency loss.

Furthermore, the features of Claim 1 advantageously provide a blade with high turning angle for increased work and reduced turbine efficiency loss. More specifically, by providing a blade as claimed, the features of Claim 1 prevent the formation of a deceleration passage between adjacent blades (see FIG. 8). For example, Applicants respectfully note FIG. 5 the rapid drop in efficiency at high turning angles in the case of conventional blades (shown as the solid curve). In contrast, a blade as described by Claim 1 demonstrates improved maintenance of turbine efficiency (shown as the broken line curve).

Therefore, for reasons fully supported by the specification in the manner described above, it is respectfully submitted that Applicants' discussion regarding increasing a blade turning angle with respect to work and efficiency loss must be considered in its entirety (see MPEP § 2141.02). Applicants' discussion of the background of the invention *as a whole* does not teach one of ordinary skill in the art to increase the turning angle of Sato to the claimed angle.

Accordingly, Applicants respectfully request withdrawal of the rejection of Claim 1 and Claims 2-4 dependent therefrom based on Sato in view of BD.

With regard to Claim 5, the Office Action rejection is based on Sato in view obvious design choice. More specifically, at page 7, line 15 through page 8, line 6, the Office Action

concedes that Sato does not disclose a ratio of blade maximum wall thickness and blade chordal length of 0.15 or more and a wedge angle of the rear edge of 10 degrees or less. Further, Applicants submit that Sato is directed to a turbine blade of low blade profile loss achieved by reducing the downstream flow velocity differential between the front side and backside of the same blade (see Abstract and Col. 1, line 24 – Col. 2, line 14).

However, the Office Action concludes that the features cited in Claim 5 are not recited to solve a particular problem “above the fact that the blade profile reduces the flow velocity differential across the blade,” and it would have been an obvious matter of design choice to modify the turbine of Sato to obtain the invention as specified in Claim 5 (Office Action at page 7, lines 21-22).

The rejection of Claim 5 is respectfully traversed for the following two reasons.

First, Applicants note that the features (a ratio of blade maximum wall thickness and blade chordal length of 0.15 or more and a wedge angle of the rear edge of 10 degrees or less) explicitly recited in Claim 5 advantageously provide a passage between a belly side and a back side of adjacent blades that decreases gradually in width from the front edge to the rear edge (see specification at page 10, lines 5-15, and FIG. 8). In turn, the gradual decrease in passage width provided by the features of Claim 5 decreases a loss in turbine efficiency (see specification at page 2, lines 1-9) at high turning angles due to flow deceleration of gases G1 and G2 in the passage between adjacent blades (see specification at page 4, lines 6-24). Moreover, exemplary FIG. 6 illustrates Applicants’ discovery that, for a wedge angle WA of the rear edge of about 10 degrees or less, the loss of turbine efficiency is decreased (see specification at page 10, lines 16-23).

Applicants respectfully submit that the above-mentioned advantages provided by the features of Claim 5 are fully supported by the disclosure and constitute advantages in addition

to reducing the flow velocity differential across the blade.

Secondly, Applicants respectfully note that general conclusions concerning what is basic knowledge to one of ordinary skill in the art, without specific factual findings and some concrete evidence in the record to support such findings, cannot support an obviousness rejection (MPEP § 2144.03b). It appears that the Office Action is taking official notice that all the features of Claim 5 and associated advantages are well known in the art.

If official notice is being taken, Applicants respectfully submit that official notice alone is not permissible as grounds for rejection in the outstanding Office Action. As stated in the MPEP at § 2144.03a:

“It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known. For example, assertions of technical facts in the areas of esoteric technology or specific knowledge of the prior art must always be supported by citation to some reference work recognized as standard in the pertinent art. *In re Ahlert*, 424 F.2d at 1091, 165 USPQ at 420-21.”

With regard to the above, Applicants respectfully submit that the features advantageously recited in Claim 5 are not “capable of instant and unquestionable demonstration as being well-known.”

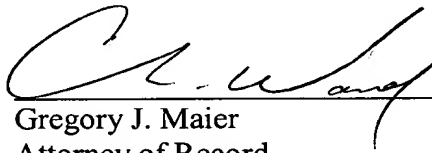
Taking of such notice is respectfully traversed, and Applicants further respectfully request citation of a reference demonstrating that the specific modifications to the ratio and wedge angle of Claim 5 are well known in the art of turbine blade design.

Accordingly, Applicants respectfully request withdrawal of the obviousness rejection of Claim 5.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance, and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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A handwritten signature in dark ink, appearing to read 'G. Maier', is written over a horizontal line.

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